

What is claimed is:

1. A diffuser assembly for finely dispersing a gas or a liquid flowable material comprising:

- a housing formed of a dense ceramic material, said housing including a base portion having a floor and an integral fitting portion having a feed tube for transfer of said medium to said base portion, said base portion having an undercut shoulder extending along the perimeter of said base portion; and
- a diffuser plate formed of a porous ceramic material, said diffuser plate having upper external and lower internal surfaces and a rim portion extending along the perimeter of said plate,

said shoulder portion of said base portion extending around at least a part of said rim portion of said diffuser portion so as to securely engage said rim portion, said internal surface of said diffuser plate and said floor of said base portion defining a chamber adapted to receive said flowable material under pressure through the feed tube of said fitting portion, said flowable material being capable of being diffused through said diffuser plate.

2. A diffuser assembly as set forth in claim 1 wherein said housing is formed of an injection molded ceramic material and said rim portion of said diffuser portion is ceramically bonded to said shoulder portion of said base portion.

3. A diffuser assembly as set forth in claim 1 wherein said floor of said base portion includes a bottom surface and a shelf surface disposed along the perimeter of said floor, said shelf surface supporting said diffuser plate along the outer perimeter of said diffuser plate, said bottom surface defining the bottom of said chamber.

4. A diffuser assembly as set forth in claim 3 wherein said bottom surface of said floor of said base portion comprises a craggy surface.

5. A diffuser assembly as set forth in claim 4 wherein said craggy surface partially contacts and supports the lower internal surface of said diffuser plate.

6. A diffuser assembly as set forth in claim 1 wherein said diffuser plate and said shoulder portion of said housing are circular.

7. A diffuser assembly as set forth in claim 1 wherein said fitting portion includes a base portion having external threads to facilitate the attachment of said assembly to a pipe for feeding said flowable material to said assembly.

8. A method of forming a ceramic diffuser assembly comprising the steps of:
- (i) providing a mold having a cavity forming the outside dimensions of said diffuser assembly;
 - (ii) providing a porous diffuser plate and a separator capable of being substantially burned away upon firing;
 - (iii) placing said diffuser plate and said separator in said mold cavity such that said separator abuts said diffuser plate;
 - (iv) securing a removable inlet tube in the mold, said inlet tube contacting said separator;
 - (v) injecting a ceramic slurry in said cavity such that said slurry surrounds the perimeter of said diffuser plate, said separator and said inlet tube;
 - (vi) allowing said ceramic slurry to partially harden so as to form a green part;
 - (vii) removing the inlet tube from said mold;
 - (viii) removing the green part from said mold; and
 - (ix) firing said green part so as to fully harden said ceramic slurry and burn-out said separator thereby forming a chamber below said diffuser plate.

9. A diffuser assembly comprising:
a diffuser element formed of a porous ceramic material;

a base formed of a non-permeable ceramic material, the base including a peripheral undercut shoulder portion that overlaps a perimeter edge of the diffuser element to sealingly connect the diffuser element to the base; and a conduit formed in a fitting portion of the base for directing a stream of gas or liquid that is capable of diffusing through the diffuser element into a chamber formed between an inner surface of the diffuser element and a floor portion of the base.

10. The diffuser assembly according to claim 9 wherein the diffuser element is ceramically bonded to the base without the use of any adhesives or bonding agents.

11. The diffuser assembly according to claim 9 wherein the diffuser assembly does not comprise any components formed of metal or organic materials.

12. The diffuser assembly according to claim 9 further comprising external threads formed on the fitting portion for use in facilitating the attachment of the diffuser assembly to a gas or liquid supply pipe.

13. The diffuser assembly according to claim 9 wherein the floor portion of the base includes a plurality of projections.

14. The diffuser assembly according to claim 13 wherein at least one of the projections contacts the inner surface of the diffuser element.

15. The diffuser assembly according to claim 9 wherein the diffuser element comprises a plate having a circular shape.

16. The diffuser assembly according to claim 9 wherein the base is formed of an injection-molded non-porous ceramic material.

17. The diffuser assembly according to claim 9 used to diffuse ozone gas into water.

18. A method of forming a diffuser assembly comprising the steps of:

- (i) positioning a diffuser element formed of a porous ceramic material, a decomposable separator and a removable conduit-former in a cavity of a mold that defines outer dimensions of the diffuser assembly, the diffuser element being positioned such that an outer surface thereof contacts a wall defining the cavity, the separator being positioned such that it contacts an inner surface of the diffuser element, and the conduit-former being positioned such that an end portion thereof contacts the separator;
- (ii) injecting a slurry that is capable of being hardened and fired to form a non-porous ceramic material into the cavity such that the slurry covers the separator, surrounds at least a stem portion of the conduit-former, and forms a base having a peripheral undercut shoulder portion that overlaps a perimeter edge of the diffuser element;
- (iii) allowing the slurry to at least partially harden to form a green part;
- (iv) removing the green part from the mold and the conduit-former from the green part; and
- (v) firing the green part to form the non-porous ceramic material and to burn out the separator and thereby form a chamber between the inner surface of the diffuser element and a floor portion of the base.

19. The method according to claim 18 wherein the cavity is configured to form a fitting portion on the base having external threads for use in facilitating the attachment of the diffuser assembly to a gas or liquid supply pipe.

20. The method according to claim 18 wherein the floor portion of the base includes a plurality of projections.

21. The method according to claim 18 wherein at least one of the projections contacts the inner surface of the diffuser element.

22. The method according to claim 18 wherein the diffuser element comprises a plate having a circular shape.

23. The method according to claim 18 wherein the separator comprises a sheet of open-celled polymeric material.